

MA477: Data Science
Lesson 10 Board Sheet — 02 February 2026
United States Military Academy, West Point
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1 Shrinkage Lesson Objectives

- Understand the mathematical formulation of shrinkage methods and be able to compare/contrast them.
- Employ shrinkage methods in regression settings

Discussion Questions

We will organize this lecture around the following five questions:

1. Why might accuracy be a misleading measure of performance in a classification problem?
2. What does it mean to say a model outputs a probability rather than a label, and why might that be useful?
3. How should we decide what “good” predictions mean when different types of errors have different consequences?
4. Give an example of a scenario where high precision is appropriate.
5. Give an example of a scenario where high recall is appropriate.
6. Why do we need an objective function to train a classifier, and how should it relate to probability?
7. How are the quantities we optimize during training connected to the metrics we use to evaluate a model afterward?

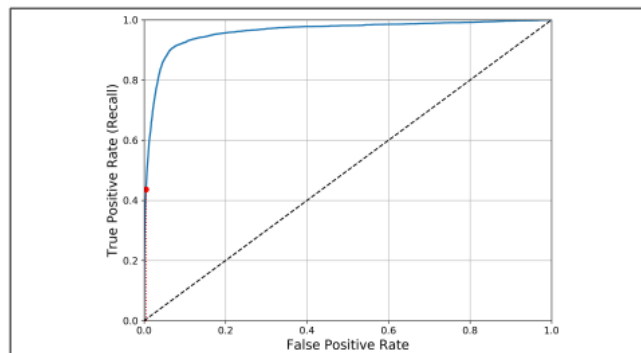


Figure 3-6. ROC curve

Figure 1